

Application No.: 10/757,847

AMENDMENTS TO THE CLAIMS

A listing of the claims presented in this patent application appears below. This listing replaces all prior versions and listing of claims in this patent application.

Claim 1 (currently amended): A heat resisting martensitic steel comprising, by weight, 0.05 to 0.30% C, not more than 0.50% Si, 0.5 to not more than 0.60% Mn, 8.0 to 13.0% Cr, 0.5 to 3.0% Ni, 1.0 to 3.0% Mo, 0.1 to 1.5% tungsten (W), 0.5 to 4% Co, 0.05 to 0.35% vanadium (V), 0.02 to 0.30% in total of one or two elements selected from the group consisting of Nb and Ta, and 0.02 to 0.10% nitrogen (N), wherein

a value of the square of a difference between the Ni amount and the Co amount, and the Ni amount are not more than values determined by a straight line drawn on a point A (1.0, 2.7%) and a point B (2.5, 1.0%) in the orthogonal coordinates shown in the attached drawing of Fig. 2 which represents a relationship between the above square value and the Ni amount, where the square value does not exceed 1.8, and

wherein an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$ is not less than 0.75 $[[0.5]]$.

Claim 2 (canceled).

Claim 3 (original): A heat resisting martensitic steel according to claim 1, which further comprises, by weight, not more than 1.5% Re, and 0.001 to 0.015% boron (B).

Claims 4-7 (canceled).

Claim 8 (original): A heat resisting martensitic steel according to claim 1, which further comprises, by weight, at least one of not more than 0.5% Cu, not more than 0.5% Ti, not more than 0.2% Al, not more than 0.1% Zr, not more than 0.1% Hf, not more than 0.01% Ca, not more

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than 0.01% Mg, not more than 0.01% yttrium (Y), and not more than 0.01% of a rare earth element.

Claim 9 (canceled).

Claim 10 (withdrawn): A gas turbine comprising:

- a turbine stub shaft;
 - a plurality of turbine discs connected to the turbine stub shaft by turbine stacking bolts via turbine spacers;
 - turbine blades each implanted in the respective disc to rotate by high-temperature combustion gas generated in a combustion device;
 - a distant piece connected to the turbine discs;
 - a plurality of compressor rotors connected to the distant piece;
 - compressor blades which are implanted to compressor discs constituting the respective compressor rotor, and which compress air; and
 - a compressor stub shaft connected to the compressor rotors, wherein
- at least one of the turbine discs, the distant piece, the turbine spacers, the compressor disc at a last stage, and the turbine stacking bolts is made of a martensitic steel comprising, by weight, 0.05 to 0.30% C, not more than 0.50% Si, not more than 0.60% Mn, 8.0 to 13.0% Cr, 0.5 to 3.0% Ni, 1.0 to 3.0% Mo, 0.1 to 1.5% W, 0.5 to 4% Co, 0.05 to 0.35% vanadium (V), 0.02 to 0.30% in total of one or two elements selected from the group consisting of Nb and Ta, and 0.02 to 0.10% nitrogen (N), wherein
- a value of the square of a difference between the Ni amount and the Co amount, and the Ni amount are not more than values determined by a straight line drawn on a point A (1.0, 2.7%) and a point B (2.5, 1.0%) in the orthogonal coordinates shown in the attached drawing of Fig. 2 which represents a relationship between the above square value and the Ni amount, and an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$ is not less than 0.5; or
 - an amount ratio of W/Mo , and the Mn amount are not more than values determined by a straight line drawn on a point C (1.3, 0.15%) and a point D (2.5, 0.37%) in the orthogonal

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coordinates shown in the attached drawing of Fig. 4 which represents a relationship between the amount ratio and the Mn amount; or

an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$, and the Mn amount are not less than values determined by a straight line drawn on a point E (0.25, 0.4%) and a point F (0.7, 0.15%) in the orthogonal coordinates shown in the attached drawing of Fig. 6 which represents a relationship between the amount ratio and the Mn amount.

Claim 11 (withdrawn): A disc for a gas turbine, which is a disc member comprising a circumferential implanting section for a turbine blade, and a plurality of bores receiving a plurality of stacking bolts by which a plurality of the disc members are integrally fastened to one another, wherein

the disc is made of a martensitic steel comprising, by weight, 0.05 to 0.30% C, not more than 0.50% Si, not more than 0.60% Mn, 8.0 to 13.0% Cr, 0.5 to 3.0% Ni, 1.0 to 3.0% Mo, 0.1 to 1.5% tungsten (W), 0.5 to 4% Co, 0.05 to 0.35% vanadium (V), 0.02 to 0.30% in total of one or two elements selected from the group consisting of Nb and Ta, and 0.02 to 0.10% nitrogen (N), wherein

a value of the square of a difference between the Ni amount and the Co amount, and the Ni amount are not more than values determined by a straight line drawn on a point A (1.0, 2.7%) and a point B (2.5, 1.0%) in the orthogonal coordinates shown in the attached drawing of Fig. 2 which represents a relationship between the above square value and the Ni amount, and an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$ is not less than 0.5; or

an amount ratio of W/Mo , and the Mn amount are not more than values determined by a straight line drawn on a point C (1.3, 0.15%) and a point D (2.5, 0.37%) in the orthogonal coordinates shown in the attached drawing of Fig. 4 which represents a relationship between the amount ratio and the Mn amount; or

an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$, and the Mn amount are not less than values determined by a straight line drawn on a point E (0.25, 0.4%) and a point F (0.7, 0.15%) in the orthogonal coordinates shown in the attached drawing of Fig. 6 which represents a relationship between the amount ratio and the Mn amount.

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Claim 12 (withdrawn): A gas turbine distant piece which is a cylindrical member comprising protrusions provided at both opposite ends of the cylindrical member; a plurality of bores in one of the protrusions, which receive a plurality of stacking bolts by which the cylindrical member is integrally fastened to turbine discs, and a plurality of other bores in the other protrusion, which receive a plurality of other stacking bolts by which the cylindrical member is integrally fastened to compressor discs, wherein the gas turbine distant piece is made of a martensitic steel comprising, by weight, 0.05 to 0.30% C, not more than 0.50% Si, not more than 0.60% Mn, 8.0 to 13.0% Cr, 0.5 to 3.0% Ni, 1.0 to 3.0% Mo, 0.1 to 1.5% tungsten (W), 0.5 to 4% Co, 0.05 to 0.35% vanadium (V), 0.02 to 0.30% in total of one or two elements selected from the group consisting of Nb and Ta, and 0.02 to 0.10% nitrogen (N), and wherein

a value of the square of a difference between the Ni amount and the Co amount, and the Ni amount are not more than values determined by a straight line drawn on a point A (1.0, 2.7%) and a point B (2.5, 1.0%) in the orthogonal coordinates shown in the attached drawing of Fig. 2 which represents a relationship between the above square value and the Ni amount, and an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$ is not less than 0.5; or

an amount ratio of W/Mo , and the Mn amount are not more than values determined by a straight line drawn on a point C (1.3, 0.15%) and a point D (2.5, 0.37%) in the orthogonal coordinates shown in the attached drawing of Fig. 4 which represents a relationship between the amount ratio and the Mn amount; or

an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$, and the Mn amount are not less than values determined by a straight line drawn on a point E (0.25, 0.4%) and a point F (0.7, 0.15%) in the orthogonal coordinates shown in the attached drawing of Fig. 6 which represents a relationship between the amount ratio and the Mn amount.

Claim 13 (withdrawn): A gas turbine compressor disc which is a disc member comprising

a circumferential implanting section for a compressor blade, and a plurality of bores receiving a plurality of stacking bolts by which a plurality of the disc members are integrally

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fastened to one another, wherein the gas turbine compressor disc is made of a martensitic steel comprising, by weight, 0.05 to 0.30% C, not more than 0.50% Si, not more than 0.60% Mn, 8.0 to 13.0% Cr, 0.5 to 3.0% Ni, 1.0 to 3.0% Mo, 0.1 to 1.5% tungsten (W), 0.5 to 4% Co, 0.05 to 0.35% vanadium (V), 0.02 to 0.30% in total of one or two elements selected from the group consisting of Nb and Ta, and 0.02 to 0.10% nitrogen (N), and wherein

a value of the square of a difference between the Ni amount and the Co amount, and the Ni amount are not more than values determined by a straight line drawn on a point A (1.0, 2.7%) and a point B (2.5, 1.0%) in the orthogonal coordinates shown in the attached drawing of Fig. 2 which represents a relationship between the above square value and the Ni amount, and an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$ is not less than 0.5; or

an amount ratio of W/Mo , and the Mn amount are not more than values determined by a straight line drawn on a point C (1.3, 0.15%) and a point D (2.5, 0.37%) in the orthogonal coordinates shown in the attached drawing of Fig. 4 which represents a relationship between the amount ratio and the Mn amount; or

an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$, and the Mn amount are not less than values determined by a straight line drawn on a point E (0.25, 0.4%) and a point F (0.7, 0.15%) in the orthogonal coordinates shown in the attached drawing of Fig. 6 which represents a relationship between the amount ratio and the Mn amount.

Claim 14 (withdrawn): A gas turbine stacking bolt which is a bar member comprising a screw portion at one end thereof, and a polygonal head portion at the other end, wherein the gas turbine stacking bolt is made of a martensitic steel comprising, by weight, 0.05 to 0.30% C, not more than 0.50% Si, not more than 0.60% Mn, 8.0 to 13.0% Cr, 0.5 to 3.0% Ni, 1.0 to 3.0% Mo, 0.1 to 1.5% tungsten (W), 0.5 to 4% Co, 0.05 to 0.35% vanadium (V), 0.02 to 0.30% in total of one or two elements selected from the group consisting of Nb and Ta, and 0.02 to 0.10% nitrogen (N), and wherein

a value of the square of a difference between the Ni amount and the Co amount, and the Ni amount are not more than values determined by a straight line drawn on a point A (1.0, 2.7%) and a point B (2.5, 1.0%) in the orthogonal coordinates shown in the attached drawing of Fig. 2

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which represents a relationship between the above square value and the Ni amount, and an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$ is not less than 0.5; or

an amount ratio of W/Mo , and the Mn amount are not more than values determined by a straight line drawn on a point C (1.3, 0.15%) and a point D (2.5, 0.37%) in the orthogonal coordinates shown in the attached drawing of Fig. 4 which represents a relationship between the amount ratio and the Mn amount; or

an amount ratio of $\text{Mo}/(\text{Mo} + 0.5\text{W})$, and the Mn amount are not less than values determined by a straight line drawn on a point E (0.25, 0.4%) and a point F (0.7, 0.15%) in the orthogonal coordinates shown in the attached drawing of Fig. 6 which represents a relationship between the amount ratio and the Mn amount.